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Change in receptor-binding specificity of recent human influenza A viruses (H3N2): a single amino acid change in hemagglutinin altered its recognition of sialyloligosaccharides.

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Human H3N2 influenza A viruses were known to preferentially bind to sialic acid (SA) in alpha2,6Gal linkage on red blood cells (RBC). However, H3N2 viruses isolated in MDCK cells after 1992 did not agglutinate chicken RBC (CRBC). Experiments with point-mutated hemagglutinin (HA) of A/Aichi/51/92, one of these viruses, revealed that an amino acid change from Glu to Asp at position 190 (E190D) was responsible for the loss of ability to bind to CRBC. A/Aichi/51/92 did not agglutinate CRBC treated with alpha2, 3-sialidase, suggesting that SAalpha2,3Gal on CRBC might not inhibit the binding of the virus to SAalpha2,6Gal on CRBC. However, the virus agglutinated derivatized CRBC resialylated with SAalpha2, 6Galbeta1,4GlcNAc. These findings suggested that the E190D change might have rendered the HA able to distinguish sialyloligosaccharides on the derivatized CRBC containing the SAalpha2,6Galbeta1,4GlcNAc sequence from those on the native CRBC.

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